Amendments to the Specification

Please replace the paragraph beginning at page 25, line 3, with the following rewritten paragraph:

In optical up-converter 180, input optical paths 170-174 are divided into groups of 1 to 6 paths such as paths 170-173. The information signals carried by the light beams in a group of multiple input optical paths are all carried in a single return light beam in a single respective output optical path. That is, for example, all the return information signals from HFCNs 130-133, carried in input optical paths 170-173 are all carried in a single output optical path ~~215~~221 toward head-end 101. More specifically, for example, the return information signals that modulate the carrier signals with frequencies between 5 and 50 MHz in input optical path 170, then modulate carrier signals with frequencies between 400 and 450 MHz in output optical path 215. The return information signals that modulate carrier signals with frequencies between 5 and 50 MHz in output optical 171, then modulate carrier signals with frequencies from 400 and 450 MHz in output optical path 215. The return information signals that modulate carrier signals with frequencies between 5 and 50 MHz in input optical path 172, then modulate carrier signals with frequencies from 500 and 550 MHz in output optical path 215. The return information signals that modulate carrier signals with frequencies between 5 and 50 MHz in input optical path 173, then modulate carrier signals with frequencies from 550 and 600 MHz in output optical path 215. Thus, four return light beams with information signals that modulate carrier signals with frequencies of 5-50 MHz are converted into a single light beam with the same information signals modulating carrier signals with frequencies of 400-600 MHz. Similarly, the information in 6 light beams with information signals that modulate carrier signals with frequencies of 5-50 MHz are converted

into a single light beam with the same information signals modulating carrier signals with frequencies of 600-900 MHz bands are non-overlapping and less than half an octave wide. Using two non-overlapping bans reduces SRS and allows filtering out second order and fourth order distortions.

Please replace the paragraph beginning at page 27, line 24, with the following rewritten paragraph:

At the head-end ~~VWDM~~ DWDM 240 separates the multiple light beams from common optical fiber 223 and routes a single respective light beam into each one of the single optical paths 241-242. An array 243 of receivers 244-245 convert the return light beams in respective optical paths 241-242 into respective electronic return signals in respective optical paths 246-247. The electronic return signals contain the same carrier signals modulated by the same information signals as the respective optical return signals.

Please replace the paragraph beginning at page 32, line 8, with the following rewritten paragraph:

Converting hubs 340 and 344 are similar to the fiber-hub of figure 1. They have an optical up-converter such as 180 of figure 1 except they not have any DWDMs, so that, each forward and return digital optical signal requires a separate fiber. Converting fiber-hubs 340 is connected by fiber 341 to DWDM fiber-hub 332. In this case, the same fiber is used for the analog television broadcasting optical signal, a forward digital optical signal, and a return digital optical signal. The analog optical signal and the forward digital optical signal must have different optical wavelengths since they are traveling in the same direction and would otherwise interfere. All the HFCNs connected to converting hub 340, receive the same

analog broadcast signal and the same forward digital signal. The optical return signals from all the HFCNs connected to converting fiber-hub 340 are optically up-converted into a single return optical signal. Fore example, if 6 HFCNs are connected to the converting fiber-hub, then their optical return signals may be up-converted into a single optical signal with carrier signals from 600 to 900 MHz. All the carrier frequencies of the digital optical signals are high frequency so cross talk between the digital optical signals and the analog optical singals should be minimal.

Please replace the paragraph beginning at page 32, line 26, with the following rewritten paragraph:

An optical fiber network connects between each fiber-hub and a respective plurality of HFCNs (e.g. 40), but only a few of the HFCNs connected to fiber-hub ~~331~~336 are shown to simplify illustration.

Please replace the paragraph beginning at page 32, line 29, with the following rewritten paragraph:

HFCN 362 is connected by a single optical fiber 361 to fiber-hub ~~331~~336. The single fiber is used for the analog broadcast optical signals, forward digital signals, and return digital signals. The fiber is attached to a WDM in the fiber-hub which combines the analog and forward digital signals and separates the return digital signal from fiber 361. Then the optical return signal is routed from the WDM to an optical up-converted and up-converter as described in relation to figure 1.

Please replace the paragraph beginning at page 33, line 10, with the following rewritten paragraph:

HFCN 370 is connected by three fibers 367-369 with fiber-hub ~~331~~336. One of the fibers can be used for analog broadcast signals, a second fiber can be used for forward digital signals and the third fiber can be used for return digital signals. Alternatively, both the second and third fibers could be used for both forward and return digital signals to provide increased capacity, or all three fibers used for analog broadcast signals and for both forward and return digital signals as described for fiber 361 above.

Please replace the paragraph beginning at page 33, line 16, with the following rewritten paragraph:

One or more independent coaxial cable networks is attached to each HFCN but only a small portion of one network attached to HFCN ~~336~~362 is shown in figure 5 in order to simplify illustration and description. Branching tree-like coaxial cable network 371 connects between HFCN ~~336~~ 362 and a plurality of CUIs 380, 381 (e.g. 500) as shown. The network includes bi-directional amplifiers such as amplifier 382 positioned every 300 to 600 meters along the cable in order to amplify the electronic signals in each direction in the coaxial cable network.

Please replace the paragraph beginning at page 35, line 6, with the following rewritten paragraph:

In Figure 7, a DWDM fiber-hub 500 of the invention receives analog broadcast television signals from optical fiber 501 through coupler 502 to optical splitter 504 which provides approximately equal portions of the analog broadcast optical signal through paths

505-506 for each of one or more hub conversion units (HCUs) 536-~~538~~537 and through paths 507-508 that are connected by optical connectors 510-511 to optical fibers 512-513 for each one or more conversion fiber-hubs that are connected to the DWDM fiber-hub.

Please replace the paragraph beginning at page 35, line 12, with the following rewritten paragraph:

DWDM fiber-hub 500 is connected to head-end by a common optical fiber 520 for the hub, which is connected to DWDM 524 by optical connection 525. A multitude of forward digital multicarrier optical signals with mutually different respective optical wavelength are routed through optical fiber 520, and a multitude of return digital multicarrier optical signals with mutually different respective optical wavelength are routed through common optical fiber 520 between the DWDM fiber-hub and the head-end. A multitude of optical paths 526-529, connected to DWDM 524, each carry optical signals of a single wavelength, the single wavelength of each of the paths being different than the wavelength of any other of paths 526-529. Each path carries a forward and/or a return multicarrier digital optical signals with the same optical wavelength. One of more of paths 526-527 are connected by respective connectors 532-533 to respective fibers 534-535 for one or more converting fiber-hubs connected to DWDM fiber hub 500. One of more of paths 528-529 are connected to respective hub conversion units (HCUs) 536-537. Respective optical connectors ~~540-541~~542-543 connect HCUs 536-537 to optical fibers ~~540-541~~542-543 which extend to respective HFCNs. The HCUs up-convert return optical signals from the HFCNs with lower frequency carrier signals into return optical signals with higher frequency carrier signals.

Please replace the paragraph beginning at page 35, line 27, with the following rewritten paragraph:

In describing the HCUs, only the details of HCU 536 will be described in order to simplify illustration and description. The other HCUs are similar and may be identical. HCU 536 contains multiple hub conversion modules (HCMs) 550-551 that convert return optical signals with lower frequency carrier signals from the HFCNs into electronic signals with higher frequency carrier signals. The HCMs also route forward optical signals (analog and digital) to corresponding HFCNs. In HCU 536, optical splitter 552 splits the analog broadcast optical signal in path 505 into approximately equal portions which are routed through optical paths 553-554 respectively to HCMs 550-551. Similarly, optical splitter 555 splits the forward digital optical signal in optical path 528 into approximately equal portions which are routed through optical paths 556-557 to each respective HCM. ~~Forward~~Return multicarrier electronic signals from respective HCMs are routed through electrical conductors 558-559 to combiner 560 which combines all the electronic signals for the FCU into a single ~~forward~~ return mulitcarrier electronic signal. Transmitter 562 modulates a laser beam with the single multicarrier electronic signal to produce a ~~forward~~ return multicarrier optical signal in optical path 563. Optical splitter 555 routes the return multicarrier optical signal for the HCU from optical path 563 into optical path 528.

Please replace the paragraph beginning at page 36, line 11, with the following rewritten paragraph:

In describing the HCMs, only the details of HCM 550 will be described in order to simplify illustration and description. The other HCMs are similar and may be identical. In HCM 550, WDM 572 routes the return optical signal from common optical path 570 to

optical path 575. Receiver 576 converts the return optical signal in optical path 575 into a return input electronic signal in electrically conductive path 557. Frequency converter 578 converts the return input electronic signal in conductive path 577 into a return output electronic signal in electrically conductive path 558. The return input electronic signal having a multitude of carrier signals of mutually different frequencies and the return output electronic signal having a corresponding multitude of carrier signals of higher frequency than the return input electronic signal. The carrier signals of the return output electronic signal are modulated by the same return information signals as the carrier signals of the return input electronic signal. Controller 580 controls receiver 576, frequency converter 578, and transmitter 562 as previously described for controller 225 with reference to figures 1-3.

Please replace the paragraph beginning at page 36, line 23, with the following rewritten paragraph:

Figure 8 illustrates a converting fiber-hub 600 which is similar to the DWDM fiber-hub of figure 7, but has no DWDM, so that, separate fibers 602-603, extending between the converting fiber node and the head-end (or a DWDM fiber node), are required for each respective HCU~~-606-608~~604-605. HCUs 606-608 are similar to HCU 536 of figure 7 and needs no further description. Optical fiber 606 carries forward analog broadcast signals which are separated into multiple signals for respective HCUs by splitter 607. One or more optical fibers 608-609 extend between the converting fiber node and respective HFCNs.

Please replace the paragraph beginning at page 40, line 3, with the following rewritten paragraph:

In converting fiber ~~node~~ hub 791, input return optical signals in separate fibers 802-803 are routed to similar respective hub conversion modules (HCMs) 815-816. Forward and return optical signals travel between the HCMs and the head-end (or a DWDM fiber-hub) through optical fibers 817-818. These HCMs are similar to the HCMs of the DWDM fiber-hub of figure 7 and the only differences will be discussed in detail. HCMs 815-816 may be identical and only HCM 815 will be described.

Please replace the paragraph beginning at page 40, line 20, with the following rewritten paragraph:

In ~~DWDM~~ converting fiber-hub 791, splitter 825 routes the forward analog optical signal from common optical fiber 826 to multiple optical fibers 807-808 which are connected to respective HFCNs. Controller 829 is connected to receive the output (and possibly also the input) return electronic signal from each HCM and to control the apparatus of each HCM. For HCM 815, controller 829 is connected to receiver 820 as described for figure 2, is connected to frequency controller 821 to control the frequency conversion of each carrier signal, and is connected to transmitter 822 as described for figure 3.